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ABSTRACT

A two-year graduate program leading to a specialists's degree was administered to train individuals in the design of instructional materials for elementary, secondary, vocational and special education curricula. The program sought to achieve a multiplier effect by placing its graduates in positions in which they could help other educators to design the instructional software demanded by new technology and also served as a pilot program for other graduate training efforts. Eighteen students constructed individualized programs involving: a) coursework in instructional development, evaluation, the behavioral sciences, administration and curriculum; and b) a year's internship working with a teacher in the field. At the conclusion of the program evaluation indicated that the participants increased their message design skills, process and production skills, and behavioral science knowledge. Their professional growth was also promoted, as evidenced by the fact that most of them planned to begin doctoral programs in instructional systems technology as a preparation for careers as leaders in instructional design and technology. (PB)

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FINAL REPORT

Grant No.	OEG-0-9-241591-2041(721)
Period:	July, 1969 - September, 1971
Institution:	Indiana University
Title:	Fellowship Program in the Design and Development of Instructional Materials
Directors:	Malcolm Fleming and Dennis Pett
OE Staff Office:	BEPD, Media Specialist Program

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1. Background of Problem

The profusion of new hardware into the educational marketplace in recent years raised hopes that meaningful changes in education would soon follow. Though change frequently comes about in this manner, it is only the subsequent availability of excellent software that separates sustained and effective change from costly and passing fad.

The critical problem upon which the justification of this program was based was the shortage of personnel specifically trained to design and develop the instructional software demanded by the promise of new technological products and processes. Projections have indicated that the need for educational developers between 1966 and 1972 will have increased fourfold.

Personnel presently available and being trained are often not prepared for the design aspects of the instructional development process. The trend has been to develop single-medium protagonists rather than to train people to select and combine media based on a knowledge of materials and media interaction. The nature of the personnel development task appears to call for an interdisciplinary program which would improve both the quantity and quality of instructional developers. This program was directed toward that end.

2. Problem Resolution

Objective 1: The primary objective of the project was to train needed specialists in the design and development of instructional materials for elementary, secondary, vocational, and special education curricula. A two-year graduate program leading to a Specialist's Degree was developed toward this end. Eighteen specialists were to be trained during this period. Terminal performances for those completing the program would include the ability to:

- lead or work within a development team which might include content specialists, learning specialists, and evaluation specialists;

- write or assist in writing behavioral objectives;

- analyze or assist in analyzing instructional problems (task analysis);

- bring relevant principles extrapolated from theory and research in the behavioral sciences to bear on the solution of problems;

- suggest alternative modes of representing concepts and alternative orders for sequencing subconcepts;

- suggest alternative configurations (teacher, hardware, materials), with particular expertise in the latter and with reference to both cost and effectiveness;

- specify characteristics of the chosen materials and costs of obtaining or producing them;

- supervise the work of para-professionals who would produce the needed materials;

- prepare or assist in the preparation of evaluation instruments consistent with the initial objectives;

- systematically employ the results of evaluation in the revision of materials until the learners reach the desired criterion.

The content of the program was characterized by its interdisciplinary nature. The aim was to produce specialists who could base instructional design decisions upon behavioral science principles. Because they would have training experiences with a wide variety of media, it was hoped that narrowness of media specialization and utilization would be replaced by an eclecticism regarding media choice in instructional problem solving by the program participants. At the same time, individual style and method were encouraged. Team approaches to problem solutions were also encouraged. Generally, practical work experience teamed a fellow with a "content specialist"-client for the analysis of a teaching-learning problem and its ultimate solution through design, testing, and evaluation.

Objective 2: Secondary objectives, more difficult to evaluate accurately, were set as goals for graduates of the program. It was (and is) hoped that as the specialists trained in this program assume their places in the field, a multiplier effect will operate. Through their roles as teachers, as workshop and institute directors, and as instructional developers, they will train and otherwise encourage additional proponents and practitioners of instructional design and development.

Specifically, graduates of the program should be able to:

- facilitate the processes of curriculum revision and instructional method innovation;

- help tailor materials to the capabilities and interests of learners, be they elementary, secondary, or vocational;

- accelerate in particular the development of materials in areas of most obvious need such as for the disadvantaged or handicapped;

- increase the scope and quantity of rigorously designed and empirically tested instructional software.

It was further expected that the completed program would serve as a model upon which a formal, ongoing, two-year graduate curriculum could be built and disseminated. As such, the program was regarded as a pilot project for subsequent groups of fellows.

3. Participants

As indicated in the last progress report, a tremendous interest was shown in the program. In summary, 18 fellows were chosen from 129 applicants. The criteria of selection were GRE scores, college grades, professional experience, recommendations, geographic distribution, experiential, and educational backgrounds. (See Appendix A - Program Participants)

The diverse backgrounds and personal goals of the 18 were at once the program's strength and greatest challenge, although it is felt that the overall performance of the participants has been very gratifying. All have shown themselves to be dedicated to educational change and to the instructional development process as a tool to assist in that change. The personal and professional growth of each seems to be significant, as evidenced in part by the products which they produced in their program tenure.

4. Program

As stated above, the program placed considerable value on individual style, methods, and goals. It is impossible to outline the curriculum since it varied for each fellow. (Appendix B lists the courses most frequently chosen.)

The second year courses included a practicum during which each fellow produced materials based on his training and experiences during the first year. In general, each participant took ten courses selected from the following list:

(1) Practicum -- required of all

R671 - Advanced Production I
R672 - Advanced Production II

(2) Instructional Design: Research

R774-5 - Seminar in Audio-Visual Communications

(3) Evaluation

P502 - Intermediate Statistics Applied to Education (Educational Psychology)
P507 - Educational Measurement (Educational Psychology)
Y535 - Evaluation Models and Techniques

(4) Behavioral Science

K576 - Social Psychology of Physical and Mental Disability (Special Education)
P600 - Theoretical Aspects of Learning and Instruction (Educational Psychology)

(5) Administration and Curricular Integration

P503 - Secondary School Curriculum (Secondary Education)
L510 - Organization of Materials and Information (Graduate Library School)

P516 - Workshop in Elementary Science (Elementary Educ.)

P535 - Elementary School Curriculum (Elementary Educ.)

L544 - Introduction to Information Sciences (Graduate Library School)

K550 - Introduction to Mental Retardation (Special Educ.)

R590 - Theories of Educational Change

R590 - Mediated Instruction

R605 - Administration of Audio-Visual Communications Programs

R636 - Technology of Education

J650 - Readings in Curriculum (Curriculum)

J670 - Current Educational Thought and the Curriculum (Curriculum)

By the time the second year was under way, most of the participants had gained adequate production skills to enable them to concentrate on the design aspects of the year-long practicum. The practicum was an intern-type experience. In general, each fellow worked with a teacher on the design, development, production, and testing of some instructional product.

The projects developed by teacher-intern teams over the entire duration of the program appears on page 8. The diversity of materials and media utilized, based upon design demands, satisfied the expectation of the program directors. (A discussion of these materials is found on page 8 of Appendix C.)

TITLE OR AREA	MEDIA/PROCESS	ACADEMIC AREA
Color mixing with light	Slide/tape	Audio-Visual (AV)
Photography is...	Slide/tape	AV
Fences	Film animation	AV
A Day of Soaring	Film	AV
Filmic Syntax	Film series	AV
The Contract	Video tape	Biology (ecology)
Geological Structure	Print/transparencies	Earth Science (JHS)
How to Use the Slide Rule	Programmed Instr.	Engineering
Interaction Analysis	Audio tape	Teacher Ed.
AV at I.U.	Film	AV (Alumni)
Lincoln's Indiana Years	Slide/tape	Social Studies (primary
WRICO Lettering	Slide/tape	AV
Developing Color Slides	Programmed Instr.	AV
Pollution	Slides	Social Studies (HS)
Drug Abuse	Charts	Social Studies (HS)
Teacher Awareness	Video tape unit	Teacher Training
ICDS: Mental Retardation	AT/VT	Special Education (Teacher Training)
Young Marrieds	Slide/tape	Home Economics
Guide to the Use of the Photoelectric Exposure meter	Print/photo	Television
Oceanography	Print/slides/transparencies	Social Studies (primary
Linear Measurement	Multimedia	Math (K-5)
Computation of Square Root	Programmed Instr.	Math (JHS)
Operating the Bell and Howell Specialist	Slide/tape	AV
Kodak Ektagraphic Slide Projector	Slides	AV
Basic Projection Optics	Slides	AV
3 Faces of Eve mapped on 3-D Theory	Transparencies	Ed. Psych.
Task Analysis	Print	IACTE Reading Project
We Don't Live Here	Multimedia	Ecology
City Market	Film	AV
KWICS and KWOCS	Slide/tape	Library

TITLE OR AREA	MEDIA/PROCESS	ACADEMIC AREA
Using the Library for Media Information	Slide/tape	Library
Youth Education in Colonial America	Slide/tape	History of Educatio
Using Indices to Educational Periodicals	Programmed Instr.	Library/Curriculum
French	Transparencies	French
Social Studies Methods	Slide/tape	Social Studies Ed.
The Only Thing She's Wearing Is What We're Selling	Multimedia	Home Economics
Fog	Film	Art
Film Techniques	Film	AV
Film	Animation	AV
Inner City Health	Film	AV

5. Observations

As the program progressed through its second year, the promise demonstrated during the first seemed to be fulfilled. The fellows continued to exhibit high quality performances, both in their fellowship-related work and their independent activities. This performance, combined with high student motivation, contributed greatly to meeting program objectives.

Tape-recorded interviews were held with students. It was generally felt by the participants that the fellowship offered them an unusual opportunity to pursue their professional educational careers. The stipends accompanying the appointments enabled this group of bright, talented (and as it turned out, creative) men and women to continue graduate work in a stimulating environment. The very fact that they were on a university campus, able to pursue a wide variety of both formal and informal activities without worries about means of support for their families, contributed substantially to the students' feeling that they would be able to achieve personally set goals.

The give-and-take between the faculty and the participants continued to the benefit of both groups and to the fulfillment of program objectives. The weaknesses of the program evidenced after the first year did not disappear; the team approach to design problem solving continued to work better for some students than for others. A stronger first year pre-practicum with guidelines for integrating theory and practice adapted to differing styles would have provided a better transition into the internship experience for some of the students.

With that in mind, the participants, under the guidance of the program directors, developed a set of design-process/designer-client "heuristics." These provide several hints to the designer about how to make the team approach to instructional design and development work. The heuristics, attached as Appendix D, are based on the experiences of working instructional designers, and should be a useful tool in the hands of most practitioners.

The individualized program continued to meet the personal needs of the various participants, and to a large degree the aims of the project. Although the program was planned to produce personnel with terminal Specialist Degrees for work in elementary, secondary, vocational, and special education programs, most of the fellows have decided to continue their graduate studies in pursuit of doctorates in instructional systems technology. This should not, however, be construed as a failure of the program. On the contrary, this course could have been predicted by the background and goals of those selected to be participants. Indirectly, the goals of the program will be met, with the multiplier effect operating to a larger degree than might have been originally expected.

Instead of producing 18 specialists to work in elementary, secondary, vocational, and special education school programs, the project seems to have produced a number of individuals dedicated to the principles of instructional design and development who will, in the opinions of the directors, achieve leadership positions in colleges, universities, school systems, state departments of instruction, and the education industry. From such positions, they will be capable of multiplying their knowledge and experiences

through the students, teachers, and administrators with whom they will work in the future, creating converts and disciples far beyond the 18 in number originally expected from this program. Perhaps more important, is the effect on learners who will benefit from materials that have been systematically planned, developed, and validated.

6. Results

In an attempt to attain some objective measures of student progress over the course of the program, entry and exit questionnaires were administered to the participants. A discussion of the results appears in this report as Appendix C. The following is a summary of the findings.

Considerable growth seems to have been achieved by almost all of the program participants, especially in message design "ability and skill" areas; process skills, production skills, behavioral science skills, and other skills. Process and production skills showed especially gratifying improvements. Through the evaluation instruments, it was possible to estimate which portions of the program contributed most to student growth: program related courses, course related projects, or other experience. The course work scored high in most cases, the related projects not as high as the directors would have liked, especially in application of behavioral science and evaluation principles.

In general, the fellows demonstrated ability as message designers. They proved to be resourceful, creative, and when conditions permitted, eclectic in their media choice. Professional growth was also indicated by increased participation in workshops, institutes, conventions, etc. Several students had some of their writing published while participants in the program. Finally, almost all of the fellows have indicated that they will seek jobs which encourage the use of message design or instructional development skills.

Appendix A

Program Participants

Name	Age	Undergraduate Major	Previous Position	Graduate Record Examination Verbal	Quant.	Total	IU GPA (4.0 max.)
Barger, Corinne L.	38	Art	Educational Media Dir.	750	530	1280	3.68
Braffet, Richard T.	38	Art	Teacher	660	520	1180	3.66
Evans, Joseph Lee	38	Guidance	Counselor	740	510	1250	3.61
Gaither, Verne Roger	29	Art, Psych.	Instructional Mtls.	580	640	1220	3.56
Goya, Wallace S.	37	Psych.	Photographer	660	530	1190	3.56
Mecklenburger, James	27	English	Teacher	710	730	1440	4.00
Mirwis, Allan N.	27	Library Science	Film Librarian	710	600	1310	3.80
Morgan, Jr., Roy R.	26	Elementary Ed.	AV Director	560	550	1110	3.89
Nemsik, James Albert	26	English Lit.	Graphics Assistant	610	560	1170	3.63
Peloquin, Paul V.	26	Educ., Geog.	CAI Assistant	550	600	1150	3.81
Rheinish, Robert K.	36	History	Historian	590	640	1230	3.79
Robinson, George H.	27	Psych.	Teacher	610	620	1230	3.95
Saiet, Ronald Alan	28	Elementary Ed.	Production Coord.	620	480	1100	4.00
Saine, Donald E.		Withdrew from program after six months for personal reasons.					
Simmons, Gary Paul	29	Art, Lit., Sci.	Teacher	670	400	1070	3.99
Sparks, Jerry D.	27	Math, Ed.	Instructor	500	660	1160	3.88
Tierney, Joan D.	41	French	Teacher	600	430	1030	3.77
Wilson, John Alfred	32	Chemistry	Instructor	700	650	1350	4.00
*Zimmerman, David	23	Art	Student	630	560	1190	3.57

*Replaced participant who withdrew.

Appendix B

First Year Course Selections

(Partial List)

Appendix B

First year course selections (partial list)

(1) Pre-practicum -- required of all

R505 - Workshop in Audio-Visual Communications

(2) Graphics and Photography

R543 - Preparation of Inexpensive Instructional Materials (basic graphics)
R544 - Production Techniques (basic photography)
R572 - Principles of Photographic Communication (advanced photography)
R573 - Principles of Photographic Communication (advanced photography)

(3) Motion Pictures and Television

R550 - Instructional Television Systems Design (Radio and Television Department)
R574 - Educational Motion Picture Production
R580 - Radio and Television Workshop (Radio and Television Department)

(4) Programing and Writing

R535 - Programed Instruction
R537 - Writing for Educational Media
R590 - Advanced Writing for Educational Media

(5) Selection and Utilization

R523 - Utilization of Audio-Visual Materials
R533 - Organization and Curricular Integration of AV Media

(6) Instructional Design

R549 - Instructional Television Program Design (Radio and Television Department)
R610 - Learning Environments Design
R634 - Theory and Principles of Message Design

(7) Behavioral Science

R525 - Advanced Educational Psychology (Educational Psychology Department)
R535 - Communication Theory (Radio and Television Department)
R540 - Learning and Cognition in Education (Educational Psychology Department)
R590 - Learner, Media, and Research

(8) Educational Curriculum, Philosophy, Measurement

P517 - Psychometric Theory (Educational Psychology)
H530 - Philosophy of Education (History and Philosophy Department)
J630 - Theory and Practice of Curriculum Development (Curriculum Department)

All participants took the Pre-practicum for both semesters. Other courses were selected from the above, typically one or more from each of the above groupings.

Appendix C

Results: A Discussion

Appendix C

Results: A Discussion

At the beginning of the Fellowship program an instrument was administered to each participant in an attempt to assess "entry" behavior on a number of objective related items. The questionnaire also helped to draw a profile of the fellows, their backgrounds, professional development, personal goals and needs. The cumulative results of that instrument appear in Appendix C[1], "Entry Evaluation."

By administering a similar instrument at the completion of the program, it was possible to compare "exit behavior" with initial competencies, and thus evaluate results which might be attributed to the participants' fellowship and related Indiana University activities. The final evaluation form is attached as Appendix C[2].

In evaluating the results of the Message Design "ability or skill area" segments of both instruments, it will be noted that entries do not always total 18 (i.e.; the number of participants). Follow-up interviews indicated the reason for this. In the entry level form, the smaller totals can be attributed to the fact that students had had no prior exposure to certain skill areas. In the exit evaluation, the lower totals were usually the result of students who had indicated on the entry test that they had already achieved adequacy or proficiency in those skills. If this is so, one might risk the assumption that group proficiency levels are even higher than indicated on the final evaluation form. In a

few instances, the less than 18 total indicates that some students had still not been exposed to certain skill and/or ability areas. This was usually the case in the items of radio, audio, group dynamics, leadership development and administration. The directors are aware of these weaknesses, and programs are being developed to facilitate learning in these areas.

In general, the growth of the students and their attainment of project goals was very gratifying. An average of more than 16 participants indicated that they had achieved "can-do" or "proficient" status on at least sixteen (two-thirds) of the twenty-four skill and ability items by the end of the program. Initially, just over half of the students expressed that feeling about the same sixteen items. Further growth seems to have occurred in all four skill areas surveyed. It is probably a safe guess that the entry level evaluations were in some cases over-estimated, as several fellows admitted in interviews, largely attributable to a lack of familiarty with some of the terms used to describe the skills. This lends more impact to the results of the exit instrument, assuming, of course, that the participants are at all capable of judging their own aptitudes. As a number of students pointed out, "proficiency" is a relative term; measured against people currently practicing message design skills in the field, it takes on its meaning. This is the yardstick against which students were asked to make their judgments.

In the entry behavior instrument, fellows were asked to identify where they had gained their skills, either on-the-job or pre-employment (i.e.; in school). The results, although

interesting, were not enlightening. (See Appendix C^1)

On the final evaluation form, an attempt was made to identify the means by which objectives were achieved. Since the program emphasized both coursework and related projects, the students were asked to measure which part of the program was most useful. Also, because of the numerous opportunities to gain practice through non-program activities at the University, the participants were asked to include this aspect of their experience in their evaluation. The results appear in the columns to the right of the double line, as Items 4a, 4b, and 5, on Part I of the final evaluation form. (See Appendix C^2)

The fellows were asked to weigh the items on a scale of five, according to how much each one contributed toward the attainment of a skill. For example, if the student learned all of his audience analysis skill in program related coursework, column 4a would receive 5 points, columns 4b and 5 zero points. If some skills were gained in all three areas, 4a might receive 2 points, 4b 2 points, and 5 one point. The total for each skill was 5 points. The results which appear in Part I of the composite final evaluation form (Appendix C^2) represent group averages for each skill and each item.

The results of this aspect of the final evaluation were quite interesting. As was expected, most of the <u>message design process skills</u> were gained through program related work. In most areas, a reasonable balance was achieved between coursework and projects. Two goals of the program, to write objectives in behavioral terms

(skill #3, stating objectives), and establishing criteria of performance (skill #7, measuring standards of performance), were particularly well served by course offerings (column 4a). Students stated that they were constantly meeting these concepts in a variety of settings.

Skill #1, analyzing the audience, skill #4, selecting the medium for its characteristics, and skill #5, treating the content for the particular medium, seemed to benefit especially from course-work related projects (column 4b). The attainment of these skills prepares the students to be eclectic media choosers and users. Non-project related work seems not to have had any significant bearing on process skills.

The results of the production skill section was a bit more difficult to interpret. One would have expected that course related projects, practicum experience in particular, would have contributed more than the evaluation form indicates. Three skills which scored high in program coursework (column 4a) were: still photography (skill #1), graphics (skill #3), and television (skill #5). Why didn't these skills score higher in the projects column (4b)? The explanation seems to lie in the nature of the production courses at Indiana University, and their sequence in the fellowship program. Obviously, the courses were excellent, considering that these areas were listed high on proficiency. Both still photography and graphics were offered early in course sequence, and the students had much opportunity to hone these skills in classroom projects before engaging in second year practicum projects.

The fact that these skills were in-point-of-fact widely used in slide/tape and multi-media practicum projects later on would seem to support this explanation. (See pages 8 and 9 of this report and page 8 of this appendix.) The students evidently felt that the courses produced high proficiency levels prior to engaging in second year program projects. In the case of television, few students had the opportunity to use the medium in course related projects. Logistical and cost/benefit considerations often precluded its use for practicum project development. Again, course experience alone was of a high enough calibre to allow eleven fellows to indicate that they could perform effectively with television should the need arise. Another factor which supports this explanation lies in the results of production skill #7, audio. In this case, no courses were offered in sound or sound recording skills. The students took it upon themselves to gain the knowledge needed outside of the program, and practiced the skill in course related projects.

Also of interest in the production skills area is the fact that most of the participants indicated ability in each area (with the notable exception of radio). This at least adds to the groundwork for eclecticism in media choice.

The behavioral science skills also seem to have come from coursework. The fact that so little practice of the principles of perception, persuasion, learning and media research were sharpened in course related projects is a bit discouraging. It seems to indicate that the students learned the theories and principles well from either classroom experience or on their own, but had little confidence in them in practical situations. Perhaps some of the students

have caught the cynicism of the instructor who, when asked how he utilized certain behavioral science message design principles he had been advocating, replied that he usually "throws them out and flies by the seat of my pants, like all media-men". A kinder explanation might be that both designer and client realize that research in the area is limited, and that "principles" are open to debate. Perhaps principles and common sense in a healthy mix will serve until such a time as the scientific basis for design decision making grows firmer.

The final category listed in the questionnaire covered four other skills. Only the last, evaluation, presented the potential for practical use. (The first, administration, was probably a "bad" item, because there was little opportunity for students to practice it as usually defined. The scores seem to be a result of coursework and observation. Subject matter and curriculum were also "bad" items because they were interpreted differently by each student: which curriculum - media, academic discipline, school, college?)

The area of evaluation provided a different problem. Although reasonably well schooled in the techniques, most of the students found themselves in situations in which it was difficult to actually practice evaluation. For a number of reasons, clients did not seem too interested in scientific product evaluation, either formative or summative. Also, the time alloted to development - usually a semester - was not adequate to perform meaningful assessments. It was generally felt by most of the students and

the directors, that this aspect of the program needed more work. Another factor, staff cutbacks of key personnel in this area, also hampered practice in this skill.

Although the educated observations of the program directors agrees in general with the self-evaluation by the students, only time will accurately measure just how well the program succeeded. Polling the graduates five years from now on a similar instrument would undoubtedly yield some interesting results.

* * * * * *

The second part of the evaluation forms asked a series of questions which were aimed at getting a clearer profile of the group's background and experience. Again, by comparing entry and exit behaviors, another measure of student growth could be achieved.

Initially, students were asked to list any design and production work they had done prior to entering the program at I.U. Twelve of the students indicated that they had participated in between two and ten design projects over a period of time from two to fifteen years. About half of these students indicated that they produced graphic or photographic visuals in the course of their work as students and teachers. The balance produced television programs, scripts and catalogs in work related experience. Overall, the work was limited to aspects of small projects and rarely included systematically designed, start-to-finish materials for instructional purposes. Media choice was limited by the abilities of this group. Nine had some experience in art or photography,

and used single media solutions to most of their problems.

On the final evaluation form, participants were asked to list any design and production work done during the course of the fellowship.

The list which appears on pages 8 and 9 or this report demonstrates the direction which some of the work took, as well as the range of areas and media choice. It may appear limited if the fact that media choice is dependent upon several considerations is overlooked. For example, many students found the slide/audio-tape format particularly useful for instructional purposes, largely because of the availability of slide projectors and audio tape recorders in classrooms. Had video tape facilities been as available, a number of students indicated that that medium might have been used, especially because of its storage and retrieval capabilities. Multi-media (usually slide/tape/film) was popular, its use being limited most often because of logistical considerations. Film was expensive, and used primarily by four fellows who chose to spend additional production course work time with that medium, including a summer workshop at Calvin Laboratories in Kansas City. Where budgets were particularly slim, students resorted to inexpensive graphic, audio, and paper-and-pencil programmed instruction techniques. In summary, the students proved to be resourceful, creative, and when conditions permitted, eclectic in their media choice.

In addition to the products listed above, several students found the time to engage in a variety of production activities

not directly related to the fellowship program. Gary Simmons and Jim Mecklenburger collaborated on Since Feeling is First, a poetry anthology with photographs to which Roger Gaither contributed some of his photographs. (Since Feeling is First was recently published by Scott Foresman.) Several students had their photographs displayed at different exhibits. Jim Mecklenburger and Jack Wilson, in connection with their curriculum minor, became "expert" in the field of performance contracting, and have since published articles on the subject which have appeared in the Phi Delta Kappan, Saturday Review, and Nation's Schools. Robert Rheinish wrote an article about the fellowship program which appeared in Media Manpower. Joan Tierney's piece on Sesame Street also appeared in the Kappan. Allan Mirwis prepared "Academic Library Instruction 1960-1970 - A bibliography." Jim Nemsik and Jerry Sparks, along with a third student, produced a slide set which has been sold for distribution, and Jim's self-instructional programmed text, "Basic Photographic Enlarging", will appear next year. Other students have indicated that they have several publications related to or including instructional design in progress.

The final evaluation form also revealed that the students participated in numerous professional workshops, institutes, and conventions, activities which only a few had previously engaged in according to the entry questionnaire. These included meetings of DAVI (AECT), AERA, AACTE, ASCD; NAVA workshops; high school audio-visual workshops; international students workshops; media workshop for inner city teachers; conference on education in the year 2000; conference in research and instructional media; conference

on the design of instruction for the disadvantaged; EPDA early childhood conference; Chicago film festival; and the ICOGRADA International Conference on Visual Communication in the Learning Industry (Vienna, 1971).

As expected, all of the students performed well in their course work; it will be recalled that participants were chosen in part because of their high GRE scores. Their grade point averages at I.U. continued to reflect academic ability. (See Appendix A)

The entry level questionnaire asked students to identify what type of job they expected to seek after leaving I.U. Generally, fellows indicated that they preferred university teaching and/or administrative positions. A few listed preferences for production type work. Some stated a preference for working in public schools, government or industry. Only three specifically indicated that they want to be instructional designers. This might be explained by the fact that most of the participants did not have a clear understanding of how message design and instructional development would be operationally defined. The applications submitted by the participants indicated that they were concerned with the design of effective instruction.

When asked on the final evaluation what type of job they wanted after leaving I.U., of those who answered the question, thirteen described message design or instructional development activities as well as teaching and research. Two said they wan to be administrators of AV or graphics programs in addition teaching. All eight fellows who have accepted positions this writing will have at least some responsibility fo tional development on their jobs:

Richard T. Braffet	Assistant Professor of Education (Curriculum)	Memorial University of Newfoundland St. John's, Newfoundland, Canada
Lee Evans	Media Program Director	Scottsdale Community Coll. Scottsdale, Arizona
James Nemsik	Instructional Systems Design Analyst	Auburn University Auburn, Alabama
Robert Rheinish	Director, Learning Resources Center	Whittier College Whittier, California
Gary Simmons	Staff Associate (Curriculum Design)	Institute for Public Safety Bloomington, Indiana
Jerry Sparks	Assistant Professor of Education, Director of Campus Graphics Service	University of Southern Mississippi Hattiesburg, Miss.
Joan Tierney	Assistant Professor, Radio-T.V.	University of Montreal Montreal, Canada
John Wilson	Administrative Assistant for Instructional Service	State Department of Public Instruction Indianapolis, Indiana

Appendix C[1]

Entry Evaluation

Appendix C[1]

Entry Evaluation

NAME_____

The information collected on this questionnaire will be used to describe average and specific qualities of the Fleming/Pett Program Fellows. Please answer as accurately as possible.

THE INFORMATION ASKED FOR IN THIS QUESTIONNAIRE SHOULD BE GIVEN IN TERMS OF YOUR ABILITIES, OBJECTIVES, EXPERIENCES, ETC. PRIOR TO YOUR ENTERING THE FLEMING/PETT PROGRAM. PLEASE IGNORE AS BEST YOU CAN CURRENT QUALITIES AND RECORD ONLY THAT INFORMATION THAT REPRESENTS YOU BEFORE THE PROGRAM.

Gre Scores: Verbal_____

Quantitative_____

Undergraduate GPA_____

Graduate GPA_____

Part I

Before entering the F/P program were you exposed to any of the following areas as a student or instructor in an instructional situation? If so, please put a check in the first column. Were you ever called upon to participate in or to perform any of the following tasks or to exhibit skills in the areas listed? If you were, please put a check in the second or third column, depending on whether it was at a cursory ("can do") level or at a skilled ("proficient") level. In the fourth and fifth columns mark whether you performed, learned, or developed the task or skill during your own education (pre-employment) and/or on the job.

*Ability or Skill Area	Exposed to	Can do	Proficient	Pre-employment	On-the-job
	1	2	3	4	5
Message Design Skills:					
Process skills:					
1. Analyzing the audience	3	9	4	7	7
2. Analyzing the task	2	5	6	4	8
3. Stating objectives	4	8	4	8	6
4. Selecting the medium for its characteristics	1	6	7	4	9
5. Treating the content for the particular medium	2	6	6	6	7
6. Setting standards of performance	1	4	7	6	5
7. Measuring standards of performance	2	5	5	6	3
8. Other_____					
Production Skills:					
1. Still photo	4	5	3	9	2
2. Motion picture	3	4	1	4	3
3. Graphics	2	4	5	7	4
4. Radio	3	4	3	8	1
5. Television	3	5	2	6	2
6. Writing	3	4	7	9	5
7. Audio	3	6	3	7	4
8. Other_____					
Behavioral Science Skills: Stating principles and giving examples of:					
1. Perception	2	6	2	6	3
2. Persuasion	2	6	3	6	3
3. Learning	2	6	4	7	4
4. Media research	2	5	2	6	1
5. Group dynamics	4	6	2	6	4
6. Leadership development	3	6	2	5	4
7. Other_____					
Other Skills:					
1. Administration	3	8	2	1	10
2. Subject matter	2	4	7	7	4
3. Curriculum	3	6	2	5	4
4. Evaluation	8	8	3	4	5
5. Other_____					

*The numbers entered in the table are the sums of all responses in each category.

Part II

Undergraduate degree(s):_____

Minors:_____

_____

Graduate degree(s):_____

Minors:_____

_____

List any design and production work you have done both inside and outside of your classes or employment:

Please list any workshops or institutes you have attended as participant or instructor:

Outline your employment experiences and educational experiences as to how they relate to your future plans; will what you have done in the past be of benefit or detriment to your future?

List any research projects in which you have participated:

What professional publications did you read regularly in the two years prior to your entrance into the F/P program?

What professional books did you read in the two years prior to the program (if you don't know the titles, then how many did you read)?

How many articles have you written that were circulated or published in the two years prior to the program; what were the topics?

When you entered the F/P program, what degree were you seeking?

As of September, 1969, what type of job did you want after leaving IU?

what type of employer?

what did you see your role to be?

what primary knowledges and skills did you think you would need?

On the back of this paper, please list any additional comments.

Appendix C^2

Final Evaluation

Appendix C^2

Final Evaluation
P/F Fellowship Program

NAME_____

The information collected on this questionnaire will be used to describe qualities of the Pett/Fleming program fellows and their IU experience. Please answer as accurately as possible.

Earlier in your tenure at IU, you responded to a questionnaire asking you to describe your abilities, objectives, experiences, etc., prior to your entering the P/F program. We would now like you to judge how much (or how little) the program and other IU activities added to your abilities, etc.

Since entering the P/F program, have you been exposed to any of the following areas? If so, please put a check in the first column. Were you ever called upon to participate in or to perform any of the following tasks or to exhibit skills in the areas listed? If you were, please put a check in the second or third column, depending on whether it was at a cursory ("can do") level or at a skilled ("proficient") level. In the fourth and fifth columsn indicate whether you performed, learned, or developed the task or skill in IST related courses and projects, or in other activities (minors, electives, self-initiated projects, etc.). How much of what you leraned is directly related to IST, how much to other sources. On a scale of 5, enter a weight in columns 4a, b, and/or 5. Please comment in space provided as the spirit moves you.

Ability or Skill Area	Exposed to	Can do	Proficient	Program (a)*	(b)**	Other
	1	2	3	4		5
Message Design Skills:						
Process Skills:						
1. Analyzing the audience		11	6	1.9	2.1	1.0
2. Analyzing the task		8	9	2.7	1.8	0.5
3. Stating objectives		3	15	3.0	1.3	0.6
4. Selecting the medium for its characteristics		6	11	2.0	2.2	0.7
5. Treating the content for the particular medium		6	11	1.7	2.8	0.5
6. Setting standards of performance	1	4	11	2.7	1.6	0.7
7. Measuring standards of performance	1	7	8	3.2	1.2	0.6
8. Other_____						
Production Skills:						
1. Still photo		9	6	2.7	1.6	0.7
2. Motion picture	2	10	2	1.9	1.2	1.9
3. Graphics		5	11	2.9	1.1	1.0
4. Radio		6	2	2.7	0.3	2.0
5. Television	3	7	4	3.1	0.5	1.4
6. Writing		6	8	1.8	1.0	2.2
7. Audio	2	9	3	0.3	1.7	3.0
8. Other_____						
Behavioral Science Skills: Stating principles and giving examples of:						
1. Perception		9	6	3.4	0.5	1.1
2. Persuasion	1	9	4	2.8	0.2	2.0
3. Learning	1	8	7	2.8	0.4	1.8
4. Media research	1	13	3	3.7	0.5	0.8
5. Group dynamics	2	8	4	2.3	0.6	2.1
6. Leadership development		9	2	1.7	0.5	2.8
7. Other_____						
Other Skills:						
1. Administration	3	12	1	2.7	0.3	2.0
2. Subject matter		7	9	1.3	0.8	2.9
3. Curriculum		8	8	2.5	0.6	1.9
4. Evaluation	2	8	6	2.7	0.9	1.4
5. Other_____						

*Courses
**Projects

List any design and production work you have done during the P/F experience. Indicate some product(s) you developed. (Title, curriculum area, media, audience objectives.)

Please list any workshops, institutes, conferences, and conventions you have attended as participant or instructor. (Indicate whether a participant, presenter, or instructor.)

List articles, photo-collections, etc., produced during P/F. (Do not repeat any listed above.) Indicate if they have been, or will be, published.

List any research projects in which you have participated:

What professional publications did you add to your repertoire in the two years since your entrance into the P/F program?

What (3) books do you feel have made the greatest contribution to your development?

Did you elect to receive an Ed.S._____

If yes, do you plan to continue for Ed.D._____

If no, how far into your Ed.D. are you? (Quals, candidacy, dissertation topic, completion date, etc.)

What type of job do you want to have after leaving IU?

(Describe briefly)

Upon completion of this questionnaire, be prepared to record (on audio tape) your general reactions to the last two years of your IU experience. (Positive, negative, course work, practicums, etc.)

Appendix D

Design Heuristics

Indiana University
School of Education
Division of Instructional
Systems Technology
Training Handout #1407
Instructional Development

INSTRUCTIONAL DESIGN HEURISTICS

"Contribution to knowledge from research can result in both systematic inquiry and heuristic observation. ...From the standpoint of systematic inquiry, confidence is an abstraction - a level at which one may declare data to be statistically significant. From the standpoint of heuristic observation, confidence is a conviction that something is true, that it will work, that one can use it with assurance."*

This paper is "a collection of strategies, tactics, gambits and ploys"* which have been found by experience to be useful in instructional design and development. These 100+ "heuristics" include seventeen quoted from an article by Haney, Lange, and Barson*. The remaining heuristics were collected by fourteen graduate students** in IST by interviews with as many faculty members ***, and edited by Malcolm Fleming.

The emphasis in what follows is on those kinds of human relationships in design and development which have usually been dealt with intuitively: which, though seldom articulated, are frequently instrumental in working with clients, committees, and teams. They are the cumulative widsom of much professional experience. "While admittedly obvious, they are useful because they are so often ignored. While admittedly overgeneralized, they are nevertheless generally true. What they lack in rigor, they make up in vigor". *

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*Haney, John B., Lange, Phil C., and Barson, John, "The Heuristic Dimension of Instructional Development," AV Communication Review 16:358-371, Winter, 1968.

**Corinne Barger, Richard Braffet, Lee Evans, Wallace Goya, Allan Mirwis, Roy Morgan, Paul Peloquin, Robert Rheinish, George Robinson, Ronald Saiet, Jerry Sparks, Joan Tierney, John Wilson, and David Zimmerman.

***Dean L. C. Larson, Art Babick, Beryl Blain, Ledford Carter, Clarence Flaten, Malcolm Fleming, Harvey Frye, Robert Heinich, Howard Levie, Dennis Pett, Tom Schwen, Mendel Sherman, Warren Stevens, Richard Stowe, and George Vuke.

The heuristics are somewhat arbitrarily divided into the following sections:

		Page			Page
1.	Introduction	2	8.	Timetable	11
2.	Objectives	3	9.	Leadership	12
3.	Client or Team	4	10.	Conflict/Consensus	14
4.	Role Delineation	5	11.	Motivation	17
5.	Designer Initiatives	7	12.	Production	18
6.	Media and Instruction Perspectives	9	13.	Evaluation	19
			14.	Mechanics	19
7.	Budget	11	15.	Continuation	20

Introduction

1. A model for message design or for instructional systems development is universal in only a general way. (Haney and others) "It might be said that people never adopt a process, they adapt it. But there are some general similarities in all the instructional development models setting forth the systems approach to education. These models are all product oriented, designed to produce gains in student learning. They pinpoint and sequence adequate performance; and they contain similar functional clusters.

   The value of a model is to rationalize procedures. It reveals relevancy of otherwise discrete activities. Robert E. deKieffer points out that the model can be used as a road map so that whenever you deal with an instructor, you can tell where you are. Also, you can tell what steps ideally you should have gone through to arrive at that particular point so that you can 'scoop back' and find out about prior decisions and other pertinent inputs before proceeding further."

2. Never announce that the group is to follow a "model." Such an announcement tends to turn people off immediately. Use a model, but use it privately, and without announcement. Or indicate the model has proved to be a useful general guide or description of the process but is not inflexible.

3. Use a design and development model as a heuristic for sorting out issues, not as a rigid plan for action. Most teachers and educators skip glibly from statements concerning learner characteristics to learning to strategies to evaluation without a second's thought. In going over the tape or transcript, the model enables you to sift through these various statements and put them in their correct slots, thus pinpointing gaps, inconsistencies, and areas that need more work.

4. Not all heuristics will work for everyone in all situations. Those which work for one person, due to personality traits, etc., may not work for others. Additional heuristics developed during your own work will facilitate your further projects.

Objectives

1. Move toward determining objectives. (Haney and others) "The developmental model is explicit in the logical place to start: the statement of behavioral objectives. But when you sit down with a professor and try to get him to do this, he is likely either to go away and not return, or say outright, 'I'll be damned if I spend my time writing behavioral objectives!' You need some techniques to get at this task indirectly. When a professor says that he wants to 'whet his students' curiosity,' you may reply, 'All right, suppose you have a student whose curiosity is whetted. What does he do?' The professor will often respond by describing student behavior. Or you can employ what the late Eugene Oxhandler called the 'observation-verification' approach, i.e., 'Let's see your exams. Let's observe what's going on in the classroom.' Then deduce and articulate what the apparent objectives are, stating them in behavioral terms, and see if the professor agrees. These are both ways of moving towards the objectives without bringing the process to a halt if the professor will not initially get at this task himself."

2. But don't be a fanatic about objectives. Get your client to be as specific as possible in outlining who is to encounter the message and what type of behavior they are suppose to exhibit afterwards. However, you will lose a client if you constantly bug him about something he'd really rather not do in the first place. The developer cannot demand the specification of objectives. Haney does not clarify this enough, but many people are unwilling to specify objectives and often don't understand their importance. Wait until the situation arises, or better yet, ask leading questions to show the client the problems of a message without objectives.

3. Early clarification of objectives avoids later problems and costs. Clients do not understand the difficulty in modifying materials after production has been completed. Before becoming deeply involved in production you should have those elements which are not easily modified specifically delineated.

4. Aim project at real needs:

   a. Student needs.
   b. Client needs.

5. The secret of successful design and production is to have everyone working for a common goal. Mutual understanding, mutual respect, and mutual conception of a shared goal are essential.

Client or Team

1. Involve the student in the developmental process. (Haney and others) "Often educators will attempt to evaluate instructional materials by saying, 'I think...' Though the evaluator may be an accomplished and experienced teacher, this statement is still in the realm of speculation. The student is the prime source of information about the effectiveness of instructional materials in achieving their objectives. Often significant revisions of materials can be obtained by having a single student work through them and discuss the experience with the developer. Avoid the temptation of having a professor go off by himself for a summer and prepare final versions of instructional materials without any students around."

2. Be sure the team members have levels of expertise to be considered as peers. This makes it less likely that decisions will be made solely on a basis of the rank of the source.

3. The fewer the people neeessary to represent the expertise and points of view, the better. Small groups function more efficiently than large. Simply adding people to make them feel involved can be overdone.

4. Group members of teams should be selected because they have expertise directly related to the mission of the team. Too often team members are chosen because of seniority, or because tradition called for a member from a particular discipline, or for some other reason than expertise and interest. Such members frequently contribute little toward the solution to the problem. Depending on the size and constraints of the problem, the team abilities should include proficiency in some or all of these:

   a. Subject matter, tasks
   b. Curriculum
   c. Evaluation
   d. Cost/effectiveness
   e. Diffusion and adoption
   f. Systems design
   g. Learner analysis
   h. Learning environments and processes
   i. Design and production

5. One of the assumptions in the design process is that the professor knows nothing about it, neither what is required, what he wants, nor how much it will cost. His concept of what he wants may well be global in scope as well as deficient in design. However, realize that his lack of knowledge of the production process is about equal to your lack of knowledge of the subject matter for which the message is to be designed.

6. Be careful about bringing in new team members after the project is underway. This may simply reopen old issues.

7. Consider other client or team member qualities than just special ability. You have to categorize your client. Find out something about him, and then procede cautiously if information is based on the opinions of others. Important considerations might be: is he easy to work with, does he have a high interest level, is there something he wants that he is willing to work for, does he have an attitude toward designers or developers?

8. Draw on your "bank" of successful experiences. Former clients may be future clients, and they can also be your "in" to future clients. You can use former clients as sources of information about fruitful avenues to pursue and with whom to work. A good product recommended by a respected colleague might win you the interest and cooperation of others in the future.

Role Delineation

1. Who initiates the design problem, and who sets it up, depends upon where the idea comes from. If the idea has originated with the producing unit, then it must assume roles such as researching the idea to determine whether there is a need, whether there is an audience, and a market for the particular product. If there appears to promise in the idea, it is then written up, possibly storyboarded, or even roughly scripted and then a client is sought out and approached. Sometimes the client will perform only in an advisory capactiy and sometimes will become actively involved in the production. At any rate, the initiating unit assumes responsibility for moving the message design and production along through the various steps to a successful completion.

   If, on the other hand, it would be the content specialist that would come to you and want to do a project, and he is financing it, it's a whole different ball of wax. He is more likely to be the one who is going to guide the projecto through. If it's a joint, cooperative idea, you might share equally in moving the project along.

2. The designer is a change agent, a human engineer. His basic job is to serve as a principal figure who brings together people to get things done. He must bring people of expertise together if there are to be any significant accomplishments. He cannot, in working with people in this context, begin to give directions or make criticisms. It really is a "feeling" back and forth. Decisions are by consensus.

3. Where your client is unacquainted with your role as a message designer, you have a salesman's function. You are trying to sell an idea. It places upon you initially the burden of showing them that you can provide them a service or a help to solve some of their problems. Secondly, when you have this relationship established and they understand that you are there to help them, then you have to begin questioning them as to where they have problems, and try to draw from them in discussion of these problems what ways you might be able to help them.

4. Designate and delineate the roles of all members of the committee with which you are working. This serves to eliminate uncertainty among individual members by showing how their role is distinct from the others and yet an integral part of the whole. Everyone must have a clear understanding of where his line of authority is, what his line of authority is, and what his responsibilities are for the final, completed product. At the same time, when meeting together, don't distinguish too much between roles so that you don't inhibit the free flow of ideas. In fact, it is likely that over a series of meetings, roles will shift from institutional ones to those depending more on personality factors, professional knowledge, and presentation style.

5. Check the client's role expectations. What is he expecting to do and what is he expecting you to do. Usually, this is a gradual process in which client and developer work out their respective roles over a period of many meetings.

6. Let your client be the content expert. Claiming content knowledge may get you into more trouble than claiming very little knowledge. You can use your lack of knowledge as a rewarding experience to him. As you gain expertise, you are really complimenting your client.

7. The designer role may blend into other development roles. When you get into designing a specific message and carrying through the implementing of it, the production of it, then you are going to have to take the lead in scheduling these kinds of things and asking for certain things to be done. At that point, you will be in the middle, the liaison person between the receiver of the

product and the producer. Similarly, the design role may blend into an evaluation role or a diffusion role or a management role, or a teaching and research role.

8. The creativity of a group is derived from its informal structure and from informally assumed roles. Often the formal structure of the group can work to inhibit creativity. In order to get the most mileage out of the informal structure of a group, there needs to be some general agreement about operational procedures at the very beginning of the project. As examples, if you have a very knowledgeable graphics man or a cameraman on the project, it is foolish to ignore his suggestions and expert opinions on the production in general and relegate him to the position of chart-maker or shutter-clicker; and his role should be clear to everyone on the team from the beginning of the project.

9. The designer-developer of a project sometimes functions primarily as a catalyst. At first he may be coordinator, and note-taker, Then he must sort out and write down and analyze what has occurred. In giving order and emphasis to the committee's meetings, he often comes out with something more than occurred during the meeting. The message designer is creating and structuring, not so much at the beck and call of the client, but searching out possibilities that the client has probably not even thought of. When dealing with a group of experts in a particular field, the message designer can well use the approach of quietly note-taking while the experts discuss pros and cons of the project, and then summarize and emphasize points of agreement for later presentation to the group.

Designer Initiatives

1. Set up criteria for selecting projects. You are always limited as to the amount of time which can be devoted to projects undertaken. Be discriminating as possible before agreeing to work personally on any project. Develop a questionnarie or some basic interview questions to help you determine to what extent the client is willing to become an active member of a team. If limited, set minimal objectives - preferably ones which can be met by technicians. If high, start implementing the design process.

2. Be prepared to assume leadership, make decisions; you can revise later. Too often, committee members are unwilling to assume the responsibility for making content and/or value decisions. When such an impasse occurs, you might have to make the decision yourself, present your version to the committee, and have them pass judgment on it. Chances are they'll go along with you or react violently; they may even make some decisions.

3. The hand that wields the pen has the power. The more writing you can do yourself, the better off you are (i.e., write the objectives, script). Use the educational authors as people to bounce ideas off at various stages of the design and production. The producer or developer who writes out agreements, scripts, treatments, etc., includes his own implicit assumptions upon which others can make suggestions. If another person does the writing, his assumptions may be lost on the producer when the time comes to do the actual work.

4. Have your own objectives well defined. Think through alternative strategies for getting there. Alternatives provide the flexibility a group process requires while retaining the goal orientation necessary to progress.

4. Learn the professor first. (Haney and others) "The students taking a course do this; so should the instructional development team. The faculty member is indispensable to instructional development in the university environment, and you should regard him as a human being, not just a functionary in the role of subject matter expert. There is often a vital distinction between his expressed needs and his real needs. Before engaging in a major development effort with a professor, find out whether or not he has the academic respect of his colleagues in his department and has a history of following through to completion projects enthusiastically begun."

   Also learn the language system of your client. You need to know enough so you can communicate, but you don't need to be an expert. Don't be awed by the content expert; it's usually not too difficult to learn the essentials, since you're nearly always in a kind of a tutorial situation with him.

6. Seek out the dirty jobs. (Haney and others) Get assigned to committees. "Media specialists naturally would like to be called upon immediately to sit on the highest councils of departmental course planning, but if you wait for that kind of call you'll spend most of your time staring at the telephone. John

E. Dietrich suggests that such time is better spent in finding out what kind of jobs departments are anxious to have done but do not want to do; then move in and help them out. Physical preparation of examinations is one area; scoring is another. Handling convention and conference support, preparing graduate study brochures, and providing artwork for research reports are others. Be superbly responsive and proficient. Such contact gives the media specialist and instruction specialist an opportunity to meet faculty and work indirectly towards the goal of instructional development."

7. Don't expect the client to see your visions, use storyboards and other devices to help him see. Such devices also help you clarify your own thinking.

8. Turn the workload back onto the client. This applies particularly where heuristic 3 or 6 above has been overdone. It is an extremely useful gimmick when faced with a work overload, but must be presented with delicacy. You might say something like this: "That's a great idea and something we really need to do. Can you delineate the objectives a little bit better -- I can't quite get a handle on it." Or, "The content is not too clear; can you bring more resources to bear or expand it." The important point is that your response has been positive, your suggestions valid, and it advances the project.

Media and Instruction Perspectives

1. Stress the human elements in an instructional system. (Haney and others). "People generally have a stereotype about systems and technology, based upon systems analysis and applications in industry and the military. A proper instructional system allows for the human use of human beings. Harold Lasswell defines technolgoy as 'an ensemble of practices by which available resources are used to achieve values.' It is important to stress that your objective is the nehancement of human values as much as a favorable costs/benefits ratio. And there are distinctive roles and functions for humans in instructional systems.

At first glance, the instructional development model appears to demean the professor. It places greater emphasis on learner involvement. It requires inputs from other specialists and involves mediation of instruction. It extends his instruction and forces him to reveal his preteaching decisions. But on the other hand, the professor has more attention paid to him, for things happen when he makes a decision. He is credited with being an innovator. So it is well to stress the human elements in an instructional

system, especially for the students and professors involved."

2. Instructional problems have multiple causes and multiple solutions. Analysis is necessary. Many teachers have not really analyzed their subject or their method. As you focus in on an instructional problem, you need to get yourself well acquainted with that problem, the content of the problem, as well as the teacher's viewpoint of that problem. He may not be able to identify specifically what the problem is. You have to begin to task analyze this along with him. Ask if you can observe so you can get more information about the problem.

3. Before designing new instructional materials, adopt or adapt those already available. Save your skill in design and development for where they're needed.

4. Examine related instructional materials together with the client. This assures greater validity in the assessment of the utility of such materials. Further, the client's pro and con statements regarding existing materials give the designer invaluable information about the client's media sophistication, prejudices, expectations. Types of filmic treatments, for example, may be better assessed in other's finished products than in your verbal descriptions.

5. Insist on consideration of alternative treatments of the subject, alternative ways to meet objectives. This serves as a protection against "catchy" ideas that can otherwise win approval without critical examination. Expecting alternatives avoids premature closure and stimulates further creative efforts. Frequently, final solutions are syntheses of the best parts of several alternatives.

6. When you abstract reality you may also reduce the learning experience. (Haney and others) "As you move the learning situation away from the real thing, you cannot assume that the students have learned the real thing. . . Simulation may move the learner farther along than lectures and readings, but don't assume that you achieve more through simulation than is actually the case.

The point of this heuristic is not the insufficiency of simulation, but the necessity to bring the student from simulation to actuality as part of the structured learning activities. The heuristic holds also for mediated instruction. No one expects a student to master a foreign language entirely in a language laboratory. Samuel N. Postlethwait stresses that his purpose in audio-tutorial botany is not to bring the students to audiotapes or film loops, but to get the students to better deal directly with plants."

7. Don't let subject matter interfere with an understanding of instructional process. (Haney and others) "The instructional development specialist needs to have techniques to get faculty to consider a new teaching device. For example, if you want to introduce an English instructor to the possibilities of programed instruction, the apparently natural step would be to show him a program on grammar or punctuation. Don't do it! He will fight the first frame of the subject matter. Show him a program on contract law. Let him read some frames and make choices as to whether some capsule case contains all of the conditions for a valid contract. In this way he will learn how the process works without getting embroiled in content controversy.

   Then, after the new or device itself is understood, your faculty member has an informed basis for imagining and considering its various applications to his subject-matter specialty."

8. Many teachers will only use materials under economic pressures, the threat of loss of employment or conversely the probability of tangible reward or recognition. Persons in the botany, zoology, geology, geography and physiology disciplines are highly visually oriented and often are used to developing and producing their own materials.

9. Users are resistant to any change in mode of presentation from that they are used to. For example, heavy users of film prefer that medium and may resist change to slides, overhead transparencies, etc.

10. Users enthusiasm for materials is inversely proportional to the size and complexity of the equipment they must carry and use. If the effect of this is a preference for simpler solutions to problems, it may be a positive factor. Otherwise, a more adequate basis for media choices is the designer's responsibility.

Budget

1. Investigate fully the feasbility (need, budget, staff interest, etc.) of product before starting design and development.

2. Know who controls the purse-strings. Work with him. Ultimately he makes the decisions that count. This strategy can save you time, limit aggravation and insure progress.

3. The development of software is dearer than the acquisition of hardware. (Haney and others) "Hardware equipment, with lights and knobs and display tubes and keyboards, has a great fascination, and there is temptation to devote to it a disproportionate share of energy and money. . . Programed instruction people some years ago had a rule-of-thumb: thirty hours of development time to one hour of student time on the program. In the case of computer-assisted instruction, the figure has been raised to 400 hours of development time to one student hour at the console. And it is in software development and utilization that the employment of hardware succeeds or fails."

4. Find the pattern or format that will balance benefits and liabilities. (Haney and others) This includes instructional benefits and liabilities, budget benefits and liabilities, media benefits and liabilities, etc.

5. Under promise and over deliver. The temptation is to do the opposite, to over-sell. In the long run this heuristic works better.

Timetable

1. Anticipate a lack of progress in the first few meetings. Don't become dismayed if you cannot get down to the business of the specification of objectives or content at the initial one or two meetings you have with a client. Often these meetings are simply a ground for the people involved to feel each other out, exchange ideas, and establish some credibility with each other.

2. Allow sufficient development time for refinement. Second thoughts come later, but are frequently worth waiting for.

3. Know when to call it quits. Perfection is never achieved. Settle for some reasonable approximation. An integral part of the process is the recordkeeping

of expenditures. A monthly statement allows assessment of financial condition and indicates future considerations in estimating and writing contracts.

4. Two view on expediting:

   a. "Keep moving! Money talks!" Using the twin whips of a deadline date and a monthly budget sheet prevents the bogging down of a product in squabbles over means.

   b. Assignment of deadlines can have a detrimental effect on progress. Instead allow an individual to whom a task is assigned to set his own pace and deadline (within reason). As the deadline date nears, ask how things are going, and if you can be of any assistance, offer your services.

Leadership

1. Be prepared with agendas, pertinent lists, reports, etc. These can keep the group on the task and provide necessary information for decision making.

   Preparation for a first meeting should be done in terms of some type of position paper -- it could be a verbal presentation, typed prose, a storyboard, possibly a model, or a schematic diagram. The designer of materials can gain the respect of the client by demonstrating that he has a grasp of the big picture, and by displaying an empathy for the problem.

2. Build and employ a task orientation. In order to do this you should:

   a. have next step in mind.
   b. have ideas for direction.
   c. avoid counter-productive activity.

3. Lead the discussion by asking questions. Use questions to:

   a. keep on topic.
   b. lead to next step.
   c. enable clients to share insights.
   d. keep issues open
   e. involve all participants.

4. Listen more than you talk (especially at initial stages). Be flexible and people-sensitive: there are no hard and fast rules or heuistics that apply in all cases. You're dealing with people in a dynamic situation; what may be the "right" tactic for this situation may be the wrong one in another similar situation. Keep tuned in and play it by ear. The meeting is a give and take affair; you must give a little to gain a little, you can't just discuss what you want, you must hear the other out, too. Development seldom proceeds in neat, step-wise blocks listed in models.

5. Acknowledge all contributions. This rewards all inputs and keeps them coming. Encourage particularly the most pertinent inputs, but actual evaluation of inputs is a group responsibility too. Don't assemble a group unless you intend to seek and use their inputs.

6. Hold the chalk (felt pen, grease pencil) yourself. With it you can keep meetings focused on next steps (agenda on board or flip chart). When the chalk-holder leads the discussions, he can select certain ideas for emphasis, group some ideas together, put some ideas aside (corner of board) for future reference, subsume some ideas under others, reword or re-label ideas, order and sequence ideas, etc.

7. Don't let words get in the way. (Haney and others) "Like most fields, instructional development has its own jargon. The point to consider here is the effect of this jargon on members of the teaching faculty. An instructional development specialist using the term 'information input overlead,' stemming from experiences in the computer field, may find that a humanities professor has turned him off.

   Not only word choice, but manner of speaking can interfere with getting the desired faculty responses. Faculty members are usually not disposed to accept dogmatic statements from persons outside their own fields. Many a faculty member sincerely believes that he can look at a class and by an 'eyeball indication' tell whether the students understand what he is talking about. To tell him flatly that this is a delusion is to cut yourself off from further, possibly productive, association. Have something to contribute: let client know that you know.

8. The world belongs to him who does his homework. Don't underestimate information, there is no substitute for it. People either consciously or unconsciously judge you on a basis of the information at your command, not on whether you know where to find the information. Have something to contribute: let client know that you know.

   If you know what is going on and other people on the committee aren't sure what is going on you have an advantage. Anticipate things that other members on your committee may not anticipate. Especially important homework is:

   a. understanding the content as thoroughly as possible before going to client.
   b. learning the motives of the client. Find out what it is he really wants to get across.
   c. examining the audience in terms of its motives.

9. Suggest, don't tell. But avoid being either patronizing or flattering. Do not talk condenscendingly; avoid specialized jargon.

   You have got to be able to converse with the client about his field, but don't presume to know more than he does. The "client is always right" attitude is not to be passed off lightly; it may be the difference between progress and no progress toward your finished product.

10. Differing views on decision-making:

    a. You must have a willingness to stick your neck out. Be willing to make decisions before all the information is in when that action seems to be indicated.
    b. Delay making decisions on particular details until all the data is collected. Film makers tend to prescribe motion pictures, television producers tend to prescribe television, and specialists tend to prescribe their biases without fully considering all the possibilities. The instructional developer must reserve judgement as long as it is practical to do so.

11. Use the meeting report or summary to advance the project. After the meeting is over, all we have is our memories, and we all know how quickly we forget. By what we include (and conversely exclude) and how we write it up in these summaries, we can greatly influence what will happen in future meetings.

Conflict/Consensus

1. Conviction must be tempered with flexibility. You may see only one approach to a problem, but be prepared to accept other viewpoints. Be willing to make accommodations when necessary. You have to keep yourself flexible. Anything that you produce is flexible until you get to the final stages, the point at which you effect closure.

2. Learn to spot the signs of trouble ahead. Such signs as passing the buck around the room, too aggressive leadership or dominance by a few, a pattern of sniping or taking pot-shots at one another's suggestions, quarreling over procedural problems or, especially, over what the problem really is, point of trouble and call for a thorough review of your strategy.

3. Avoid the tendency to "overreact" to objections of all kinds. Be objective and able to accept criticism without letting it damage your ego. For communication of an interpersonal nature, each individual ideally would be at peace with himself, as psychoneuroses and self-centeredness may be the most serious detriment to communication. Don't be defensive. Little is black or white, most all issues involve greys. So objections, other shades of grey, are to be expected.

4. Differing views on avoiding or allowing open conflict:

   a. Let the client blow off steam. Getting his gripes, real or imagined, off his chest is often the best catharsis for a troubled or insecure client and is frequently a sign that he may be ready to get to work soon.
   b. Structure the situation to avoid direct confrontations. If you get behind them and push you get nowhere, but if you get in front and pull gently, progress will be made. Develop a versatility in working with different kinds of people. This comes from being able to sensitize yourself to personalities of people.

5. Careful of the No people. Confronting you will be a number of participants, many who can say No, few who say Yes. Watch that the No people don't express themselves too adamantly to the people above them and you because then a favorable decision is

harder to get. Talk to the No people. Go to them ahead of time asking about objectives and strategies they would do. Without revealing your own objectives, let them suggest objectives and strategies. They may come around to yours or come up with a better alternative.

6. Differing views on getting compliance:

   a. Look like you're supposed to have orders taken from you. The military calls this "command presence." Ultimately, the best way to get people to do things for you is to have the power of hiring and firing.
   b. Some problems are like a piece of cooked spaghetti. If you get behind them and push you get nowhere, but if you get in front and pull gently, progress will be made. Develop a versatility in working with different kinds of people. This comes from being able to sensitize yourself to personalities of people.

7. Take the position of an arbitrator. Facilitate communication by clarifying points and positions, easing unpleasantness. You have to watch for misunderstandings and miscommunications, and you have to insert yourself, gently, to clarify ideas and avert unnecessary conflict.

8. Weight of sheer logic isn't necessarily the deciding factor. A lot has to do with personality and whether people respect you. This is difficult to replicate.

9. Faculty members are not generally moved to change their behavior by reading reports of Instructional research. (Haney and others) "An Instructional developer has on hand enough research reports so that if he were to stack them one on top of the other, he could diminutively replicate the Washington monument, with the crowning beacon being his own dissertation. But when a young researcher tells a tenured professor about an elegantly designed and rigorously controlled study that 'failed to disprove the null hypotheses,' he is likely to get the reply, 'Son, you haven't told me a damn thing.'' Findings of no significant difference produce no significant deference. Such reports may help to prop up a cooperative professor who has misgivings, or to counter certain negative attitudes among students and administrators. But the point to remember is that

a professor or student or administrator will accept a change when it produces a perceived net gain from his own point of view and on his own terms. The task of the instructional developer is to find out what that might be and bring it about."

10. A person doesn't mind changing if he feels secure. When one feels his position threatened, he will cease to be an effective member of the committee. The message designer working in a group has to be alert all the time to things that are going on and the undercurrents, as much as he can read them. He has to be sensitive at all times to what he says, how he says it, when he says it, relative to other people in the group.

11. Be willing to take advantage of opportunities that other people give you to point out their shortcomings. Don't take unkind cuts at people, even when they give you that beautiful opportunity.

12. Change is a partnership; if it is necessary to change, make it (at least appear to be) a group decision. In resolving differences of opinion, you have to try to develop among the people you are working with an understanding that they listen to other people, consider other people's opinions. Wherever possible, you try to get them to agree on these points of disagreement, knowing that they have to give sometimes, and sometimes they take.

13. Be imaginative in loosening constraints. Do this where possible and as needed in:

    a. design.
    b. money.
    c. personnel.
    d. equipment.
    e. other resources.

    This may sometimes mean trying out alternative ways over which there has been disagreement. Decisions can be made later when alternatives can be more objectively viewed in a prototype stage or even a testing stage. The best choice is frequently not evident at a talk stage.

14. Depersonalize ideas. Conflict sometimes arises when ideas are identified as "mine," "yours," "his." Putting ideas on a board or flip chart separates them from their source. Ideas "out there" before the group become a group product and can be more rationally compared and amended.

15. Always have the patience to go the long way around to achieve a goal. You can get around obstacles by not revealing them so that others may object. If the obstacles have been revealed, be willing to take longer in resolving them so as to avoid antagonizing people.

16. Proceed on the basis of agreements. (Haney and others) "There is a tendency to avoid tackling issues directly, for agreement implies approval, and in committee situations precise agreement is impossible. For example, when working with multiple-section, multiple-instructor courses, it is important to get agreements as far as possible on procedures, criteria, objectives, and grading instruments. Often it is sufficient to delineate the range (the maximum and the minimum) of acceptability, which is in effect an agreement to disagree within specified limits. With a failure to specify such limits, the course will drift from week to week, compounding uncertainty and uncontrolled variables."

Motivation

1. Make the experience rewarding for all participants. This is central to continued progress. It is not easy with a professional client in a stiuation like this to make the interaction and setting rewarding. There must be a continual effort to find out what is rewarding to the client. It could be things (instructional materials) or simply praise and approval. Know what it is that is rewarding to individual members of a team, and see to it that such rewards are built into the working process.

2. See that faculty members are rewarded for work in instructional development. (Haney and others) "The normal academic reward system is stacked against a professor who spends the required long hours and energy developing validated course instructional materials. However, most universities have a stated policy of taking good teaching into account in decisions for promotion, tenure, and salary increases. One reason publication generally dominates the selection for these rewards is that publication is visible, quantitative, and qualitative, in that referees pass judgment on the professor's research writing prior to publication, and the whole academic world can acclaim or discredit it subsequently. Teaching, on the other hand, traditionally occurs in the sealed chambers of the self-contained classroom, and information about it transpires with uncertainty and distortion. The instructional developer is on solid ground when he establishes that the production of validated instructional

materials is similarly visible, quantitative, and qualitative.

In addition, professors can find avenues open to publication in prestige journals for reports of the design and data from instructional development, if their approach is comparably rigorous to conventional research, and the writing avoids the pitfalls of the common. 'How I Taught Freshman Psychology on TV' type of article. Further, arrangement for commercial distribution of developed materials can provide financial rewards for both professor and institution.

3. If the client or team member has a vested interest he is more apt to cooperate and maintain interest. You must be able to convince him that you will have something that he will be able to use. Professors do not generally want training materials for their students but for themselves. The level of their enthusiasm is usually in direct proportion to the level that the materials will garner accolades or provide some monetary consideration for them.

4. Keep group informed of progress. This helps everyone to feel involved. Make sure that the project's timetable allows for the duplicating or circulating of all materials prepared at various stages, e.g., objectives, treatments, content outlines, rough designs, photographs, etc., so that each member will have the opportunity to view them critically.

5. When things seem to be at a standstill, come up with a concrete product. This will help keep interest alive and maintain progress toward your goal. Interest and accomplishments go hand in hand; when accomplishments drop off, interest wanes.

6. Turn on, but be sure you can handle the output. Once you get the client enthusiastic and working, he may inundate you with work. Failure to follow through with action on your part may seriously affect relations here, so alway be prepared to handle the output or suffer the consequences.

7. Let the client have some fun. The actual production activity (film) is often glamorous or fun in the eyes of the client. The odious tasks of conept analysis, objectives, scripting, etc., must be performed first, of course, but allow client to contribute and participate in some of what he perceives to be the creative aspects of instructional development.

Production

1. In actual production of a project, the director has to be the authority and everyone has to know it. There cannot be committee consensus when it comes to handling movie crews and establishing sequencing with a large group. All the people involved, irrespective of who may have a better idea, must defer to the director's judgment, since all the homework has been done at this point; the scripts have been written and shooting arrangements have been made; and all arguments of necessity must have been resolved in these prior steps to the actual production.

   After the production or a pilot version has been completed, then debate about relative merits of different approaches to the various problems within the project can and should be reopened amongst the production team.

2. Try to conserve the time of actors and models by blocking shots that they are to be in and having all preparations made in advance.

3. Arranging for actors and models to see the completed film product is good public relations.

4. Have alternative shooting sites preselected in case you are unable to shoot at your first choice.

5. Always make two "takes" of every scene in case one is demaged during processing.

6. Keep film footage on file so that it can be reused in other films.

Evaluation

1. Field test in all stages of development if possible. The earlier that design inadequacies are revealed, the less costly they are to remedy.

2. Include all facets of the message in trials. Try to simulate the final product. i.e. if it's a visual, produce and test a visual.

3. Sample all major populations that may use the product. Maybe it's possible to meet only part of their needs, several versions may even be necessary. Early evaluation with each target audience makes for intelligent decision making and avoids excessive expectations.

4. Estimate the advisability of each further refinement step. Is the improvement in the final produce going to be worth that additional time and effort?

Mechanics

1. Provide a setting conducive to the task. Have furniture appropriately chosen and arranged for meetings. Provide coffee, etc., for rewards and changes of pace. Provide the tools for the task: pencils, paper, chalkboard, etc. Pick a place away from the client's phone and routine demands and have your own calls held.

2. Never encroach on someone else's time when you can encroach on your own. Organize the work of your office around the convenience of the people you serve, rather than around your office personnel. Be willing to make work in the office if it will solve problems for someone outside.

3. Keep careful records. Include records of:

   a. actual accomplishments - output.
   b. cost in dollars.
   c. cost in time.

4. Permit access by all members of the committee to all facets of the committee's workings. Allow everyone to see how his role is part of the complete process and how all relevant inputs are available to all participants.

Continuation

1. The development of software is a continuous process. (Haney and others) "In some areas of endeavor, you can 'do' something and have done with it. Not in instructional development. The production of validated materials involves a series of successive approximations. And then when you are able to demonstrate that your materials can achieve your objectives, you are likely to move to objectives in a higher domain. This process is more than ordinary evaluation and revision; it involves a commitment to continuous refinement and improvement.

2. Structure the conditions for survivability. (Haney and others) "Instructional development projects have a high mortality. What is begun with high expectation and energy often runs down after a year or two and passes out of existence. Ironically it takes about this long for publicity about an innovative project to circulate, and so by the time visitors arrive in numbers, many times all they can see are closets of stashed equipment. Attention must be given to building a staff that can continue the work and supply renewed ideas and energy when the original major professor turns his attention

to other things. Often, pilot or experimental projects have a basis in special funding that is difficult to transfer to the regular budget. Institutional budgeting on a program basis, rather than the common 'departmental pot' basis, can facilitate this transfer. Of course, if a new instructional development is evaluated for its balance of cost-and-benefits and if it obviously cannot feasibly be brought up to acceptable standards, it should be phased out. But the point to stress here is that this action should be a deliberate decision, not the result of dissipation or default."

3. Structure the conditions for transferability. (Haney and others) "Often it is not as hard to develop instructional materials in one university as it is to get them used in other universities. The N-I-H ('Not Invented Here') syndrome is very real. Institutions that will accept transfer credit for a student who has taken a course at another institution are loath to accept on their campus the instructional materials and teaching system that were the essence of that course. The feeling is that it is necessary to start from scratch and develop new printed materials, new tapes, kinescopes, instruction kits, and organization from local resources.

Ideally and eventually, collegiate instruction should be more cooperative, coordinated, compatible, efficient, and intercollegiate. What is immediately needed is a way of assembling the painstakingly developed supporting materials, objectives, teaching examples, and demonstrations in a 'smorgas-media' fashion so that a development team at another institution can examine, select, arrange, adapt, combine, and put the local label on a final course package.

Thus those who wish to transfer or adopt instructional packages must be reminded that it's not just a matter of bringing home a new baby. There is also the commitment to the process, nurture, and continuous development. Moreover, those who generate good ideas for adoption need to present them for adoption in such manner as to assure good homes for their development."